

#### IV. K. Collection System Operation: Engineering - Construction

Question	Response	Documentation Available	
		Yes	No
Who constructs new sewers? If other than the owner or operator, does the owner or operator review and approve the design?			
Is there a document that describes the procedures that the owner or operator follows in conducting their construction inspection and testing program?			
Are there any standard forms that guide the owner or operator in conducting their construction inspection and testing program?			
Is new construction inspected by the owner or operator or others?			
What are the qualifications of the inspector(s)?			
What percentage of time is a construction inspector on site?			
Is inspection supervision provided by a registered professional engineer?			
How is the new gravity sewer construction tested? (Air, water, weirs, etc.)			
Are new manholes tested for inflow and infiltration?			
Are new gravity sewers televised?			
What tests are performed on pump stations?			
What tests are performed on force mains?			
Is new construction built to standard specifications established by the owner or operator and/or the State?			
Is there a warranty for new construction? If so, is there a warranty inspection done at the end of this period?			

Comments:

#### IV. L. Collection System Operation: Pump Station Operation

Question	Response	Documentation Available	
		Yes	No
How many pump stations are in the system? How many have backup power sources?			
Are enough trained personnel assigned to properly maintain pump stations?			
Are these personnel assigned full-time or part-time to pump station duties?			
Are there manned and un-manned pump stations in the system? How many of each?			
Is there a procedure for manipulating pump operations (manually or automatically during wet weather to increase in-line storage of wet weather flows?			
Are well-operating levels set to limit pump start/stops?			
Are the lead, lag, and backup pumps rotated regularly?			

Comments:

#### IV. L. 1. Collection System Operation: Pump Stations - Inspection

Question	Response	Documentation Available	
		Yes	No
How often are pump stations inspected?			
What work is accomplished during inspections?			
Is there a checklist?			
Are records maintained for each inspection?			
What are the average annual labor hours spent on pump station inspections?			
Are there Standard Operating Procedures (SOPs) and Standard Maintenance Procedures (SMPs) for each station?			
What are the critical operating characteristics maintained for each station? Are the stations maintained within these criteria?			

Comments:

#### IV. L. 2. Collection System Operation: Pump Stations - Emergencies

Question	Response	Documentation Available	
		Yes	No
Is there an Emergency Operating Procedure for each pump station?			
Is there sufficient redundancy of equipment in all pump stations?			
Who responds to lift station failures and overflows? How are they notified?			
How is loss of power at a station dealt with? (i.e. on-site electrical generators, alternate power source, portable electric generator(s))			
What equipment is available for pump station bypass?			
What process is used to investigate the cause of pump station failure and take necessary action to prevent future failures?			

Comments:

**IV. L. 3. Collection System Operation: Pump Stations - Emergency Response and Monitoring**

Question	Response	Documentation Available	
		Yes	No
How are lift stations monitored?			
If a SCADA system is used, what parameters are monitored?			

Comments:





#### IV. K. Collection System Operation: Engineering - Construction

Question	Response	Documentation Available	
		Yes	No
Who constructs new sewers? If other than the owner or operator, does the owner or operator review and approve the design?			
Is there a document that describes the procedures that the owner or operator follows in conducting their construction inspection and testing program?			
Are there any standard forms that guide the owner or operator in conducting their construction inspection and testing program?			
Is new construction inspected by the owner or operator or others?			
What are the qualifications of the inspector(s)?			
What percentage of time is a construction inspector on site?			
Is inspection supervision provided by a registered professional engineer?			
How is the new gravity sewer construction tested? (Air, water, weirs, etc.)			
Are new manholes tested for inflow and infiltration?			
Are new gravity sewers televised?			
What tests are performed on pump stations?			
What tests are performed on force mains?			
Is new construction built to standard specifications established by the owner or operator and/or the State?			
Is there a warranty for new construction? If so, is there a warranty inspection done at the end of this period?			

Comments:



#### IV. L. Collection System Operation: Pump Station Operation

Question	Response	Documentation Available	
		Yes	No
How many pump stations are in the system? How many have backup power sources?			
Are enough trained personnel assigned to properly maintain pump stations?			
Are these personnel assigned full-time or part-time to pump station duties?			
Are there manned and un-manned pump stations in the system? How many of each?			
Is there a procedure for manipulating pump operations (manually or automatically during wet weather to increase in-line storage of wet weather flows?			
Are well-operating levels set to limit pump start/stops?			
Are the lead, lag, and backup pumps rotated regularly?			

Comments:

#### IV. L. 1. Collection System Operation: Pump Stations - Inspection

Question	Response	Documentation Available	
		Yes	No
How often are pump stations inspected?			
What work is accomplished during inspections?			
Is there a checklist?			
Are records maintained for each inspection?			
What are the average annual labor hours spent on pump station inspections?			
Are there Standard Operating Procedures (SOPs) and Standard Maintenance Procedures (SMPs) for each station?			
What are the critical operating characteristics maintained for each station? Are the stations maintained within these criteria?			

Comments:

#### IV. L. 2. Collection System Operation: Pump Stations - Emergencies

Question	Response	Documentation Available	
		Yes	No
Is there an Emergency Operating Procedure for each pump station?			
Is there sufficient redundancy of equipment in all pump stations?			
Who responds to lift station failures and overflows? How are they notified?			
How is loss of power at a station dealt with? (i.e. on-site electrical generators, alternate power source, portable electric generator(s))			
What equipment is available for pump station bypass?			
What process is used to investigate the cause of pump station failure and take necessary action to prevent future failures?			

Comments:

**IV. L. 3. Collection System Operation: Pump Stations - Emergency Response and Monitoring**

Question	Response	Documentation Available	
		Yes	No
How are lift stations monitored?			
If a SCADA system is used, what parameters are monitored?			

Comments:

#### IV. L. 4. Collection System Operation: Pump Stations - Recordkeeping

Question	Response	Documentation Available	
		Yes	No
Are operations logs maintained for all pump stations?			
Are manufacturer's specifications and equipment manuals available for all equipment?			
Are pump run times maintained for all pumps?			
Are elapsed time meters used to assess performance?			

Comments:

**IV. L. 5. Collection System Operation: Pump Stations - Force Mains and Air/Vacuum Valves**

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator regularly inspect the route of force mains?			
Does the owner or operator have a program to regularly assess force main condition?			
Is there a process in place to investigate the cause of force main failures?			
Does the owner or operator have a regular maintenance/inspection program for air/vacuum valves?			
Have force main failures been caused by water hammer?			

Comments:

**V. A. Equipment and Collection System Maintenance: Maintenance Budgeting**

Question	Response	Documentation Available	
		Yes	No
How does the collection system owner or operator track yearly maintenance costs?			
Is there a maintenance cost control system?			
Are maintenance costs developed from past cost records?			
How does the owner or operator categorize costs? Preventive? Corrective? Projected Costs? Projected Repair?			
How does the owner or operator control expenditures?			

Comments:

**V. B. Equipment and Collection System Maintenance: Planned Maintenance**

Question	Response	Documentation Available	
		Yes	No
Are preventive maintenance tasks and frequencies established for all pump stations and equipment?			
How were preventive maintenance frequencies established?			
What percentage of the operator's time is devoted to planned as opposed to unplanned maintenance?			
What predictive maintenance techniques are used as part of PM program?			
Is there a formal procedure to repair or replace pump stations and equipment when useful life is reached?			
Has an energy audit been performed on pump station electrical usage?			
Is an adequate parts inventory maintained for all equipment?			
Is there a sufficient number of trained personnel to properly maintain all stations?			
Who performs mechanical and electrical maintenance?			
Are there Standard Maintenance Procedures (SMPs) for each station?			

Comments:



**V. C. Equipment and Collection System Maintenance: Maintenance Scheduling**

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator plan and schedule preventive and corrective maintenance activities?			
Is there an established priority system? Who sets priorities for maintenance?			
Is a maintenance card or record kept for each piece of mechanical equipment within the collection system?			
Do equipment maintenance records include the following information: <input type="checkbox"/> maintenance recommendations, <input type="checkbox"/> instructions on conducting the specific maintenance activity, <input type="checkbox"/> other observations on the equipment, <input type="checkbox"/> maintenance schedule, <input type="checkbox"/> a record of maintenance on the equipment to date.			
Are dated tags used to show out-of-service equipment?			
Is maintenance backlog tracked?			
How is O&M performance tracked and measured?			
What percent of repair finds are spent on emergency repairs?			
Are corrective repair work orders backlogged more than six months?			
Is maintenance performed for other public works divisions?			
How are priorities determined for this work?			
How is this work funded?			
Are maintenance logs maintained for all pump stations?			

Comments:

**V. D. Equipment and Collection System Maintenance: Maintenance Right-of-Way**

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator perform scheduled maintenance on Rights-of-Way and Easements?			
Does the owner or operator monitor street paving projects?			
Does the owner or operator have a program to locate and raise manholes (air valves, etc) as needed?			
How are priorities determined?			
How is the effectiveness of the maintenance schedule measured?			

Comments:

**V. E. Equipment and Collection System Maintenance: Sewer Cleaning**

Question	Response	Documentation Available	
		Yes	No
Is there a routine schedule for cleaning sewer lines on a system wide basis, e.g., at the rate of once every seven to twelve years or a rate of between 8% and 14% per year?			
What is the owner or operator's goals for annual system cleaning?			
What percent of the sewer lines are cleaned, even high/repeat cleaning trouble spots, during the past year?			
Is there a program to identify sewer line segments that have chronic problems and should be cleaned on a more frequent schedule?			
What is the average number of stoppages experienced per mile of sewer pipe per year?			
Has the number of stoppages increased, decreased, or stayed the same over the past five years?			
Are stoppages diagnosed to determine the cause?			
Are stoppages plotted on maps and correlated with other data such as pipe size and material, or location?			
Do the sewer cleaning records include the following information: <input type="checkbox"/> date and time, <input type="checkbox"/> cause of stoppage, <input type="checkbox"/> method of cleaning, location of stoppage or routine cleaning activity, <input type="checkbox"/> identity of cleaning crew, <input type="checkbox"/> further actions necessary/initiated?			
If sewer cleaning is done by a contractor are videos taken of before and after cleaning?			

Comments:

## V. E. 1. Equipment and Collection System Maintenance: Sewer Cleaning - Cleaning Equipment

Question	Response	Documentation Available	
		Yes	No
What type of cleaning equipment does the owner or operator use?			
How many cleaning units of each type does the owner or operator have? What is the age of each?			
How many cleaning crews and shifts does the owner or operator employ?			
How many cleaning crews are dedicated to preventive maintenance cleaning?			
How many cleaning crews are dedicated to corrective maintenance cleaning?			
What has the owner or operator's experience been regarding pipe damage caused by mechanical equipment?			
Where is the equipment stationed?			

Comments:

## V. E. 2. Equipment and Collection System Maintenance: Sewer Cleaning - Chemical Cleaning and Root Removal

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator have a root control program?			
Does the owner or operator have a FOG program?			
Are chemical cleaners used?			
What types of chemical cleaners are used?			
How often are they applied?			
How are the chemical cleaners applied?			
What results are achieved through the use of chemical cleaners?			

Comments:

**V. F. Equipment and Collection System Maintenance: Parts Inventory**

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator have a central location for the storage of spare parts?			
Have critical spare parts been identified?			
Are adequate supplies on hand to allow for two point repairs in any part if the system?			
Is there a parts standardization policy in place?			
Does the owner or operator maintain a stock of spare parts on its maintenance vehicles?			
What method(s) does the owner or operator employ to keep track of the location, usage, and ordering of spare parts? Are parts logged out when taken by maintenance personnel for use?			
Does the owner or operator salvage specific equipment parts when equipment is placed out-of-service and not replaced?			
How often does the owner or operator conduct a check of the inventory of parts to ensure that their tracking system is working?			
Who has the responsibility of tracking the inventory?			
For those parts which are not kept in inventory, does the owner or operator have a readily available source or supplier?			

Comments:



**V. G. Equipment and Collection System Maintenance: Equipment and Tools Management**

Question	Response	Documentation Available	
		Yes	No
Is there a list of equipment and tools used for operation and maintenance?			
Do personnel feel they have access to the necessary equipment and tools to do all aspects of operation and maintenance of the collection system?			
Is there access to suitable equipment if the owner or operator's equipment is down for repair?			
Does the owner or operator own or have access to portable generators?			
Where does the owner or operator store its equipment?			
Is a detailed equipment maintenance log kept?			
Are written equipment maintenance procedures available?			
What is the procedure for equipment replacement?			
Are the services of an in-house vehicle and equipment maintenance services used?			
What is the typical turnaround time for equipment and vehicle maintenance?			

Comments:

## VI. Management Information Systems: Performance Indicators

Question	Response	Documentation Available	
		Yes	No
How many sanitary sewer overflows (SSOs) have occurred in the last 5 years? How many less than 1,000 gallons?			
Does the owner or operator document and report all SSOs regardless of size?			
Does the owner or operator document basement backups?			
Are there areas that experience basement or street flooding?			
How many SSOs have reached "Waters of the US"? Is there a record?			
Approximately, what percent of SSOs discharge were from each of the following in the last 5 years: manholes, pump stations, main and trunk sewers, lateral and branch sewers, structural bypasses?			
What is the per capita wastewater flow for the maximum month and maximum week or day?			
What is average annual influent BOD?			
What is the ratio of maximum wet weather flow to average dry weather flow?			
Approximately, what percent of SSO discharge were caused by the following in the last 5 years: debris buildup, collapsed pipe, root intrusion, capacity limitations, excessive infiltration and inflow, FOG, vandalism?			
What percent of SSOs were released to: soil; surface water; basements; paved areas; coastal, ocean, or beach areas; rivers, lakes or streams?			
For surface water releases, what percent are to surface waters that could affect: contact recreation, shellfish growing areas, drinking water sources?			
How many chronic SSO locations are in the collection system?			



Are pipes with chronic SSOs being monitored for sufficient capacity and/or structural condition?			
Prior to collapse, are structurally deteriorating pipelines being monitored for renewal or replacement?			
What is the annual number of mainline sewer cave-ins? What was the cause (i.e. pipe corrosion, leaks, etc.)			
What other types of performance indicators does the owner or operator use?			

Comments:

**VII. A. Sewer System Capacity Evaluation (SSES): Internal TV Inspection**

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator use internal T.V. inspection? If so please describe the program.			
Do the internal TV record logs include the following: <input type="checkbox"/> pipe size, type, length, and joint spacing; <input type="checkbox"/> distance recorded by internal TV; <input type="checkbox"/> results of the internal TV inspection; <input type="checkbox"/> internal TV operator name; <input type="checkbox"/> cleanliness of the line; <input type="checkbox"/> location and identification of line being televised by manholes?			
Is a rating system used to determine the severity of the defects found during the inspection process?			
Is there documentation explaining the codes used for internal TV results reporting?			
Approximately what percent of the total defects determined by TV inspection during the past 5 years were the following:			
Are main line and lateral repairs checked by internal TV inspection after the repair(s) have been made?			

Comments:

## VII. B. SSES: Survey and Rehabilitation (general)

Question	Response	Documentation Available	
		Yes	No
Have SSES's been performed in the past? If so, is documentation available?			
Has any sewer rehabilitation work been done in the past 15 years? If so, please describe?			
Does the owner or operator have standard procedures for performing SSES work?			
Do the SSES reports include recommendations for rehabilitation, replacement, and repair?			
Were defects identified in the SSES repaired?			
Does the owner or operator have a multi-year Capital Improvements Program that includes rehabilitation, replacement, and repair?			
How are priorities established for rehabilitation, replacement, and repair?			
Has the owner or operator established schedules for performing recommended rehabilitation, both short term and long term?			
Has funding been approved for the recommended rehabilitation?			
Is post rehabilitation flow monitoring used to assess the success of the rehabilitation?			

Comments:

**VII. C. SSES: Sewer Cleaning Related to I/I Reduction**

Question	Response	Documentation Available	
		Yes	No
Are sewers cleaned prior to flow monitoring?			
Are sewers cleaned prior to internal T.V. inspection?			
When cleaning, is debris removed from the system?			

Comments:

## VII. D. SSES: Flow Monitoring

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator have a flow monitoring program? If so, please describe.			
Does the owner or operator have a comprehensive capacity assessment and planning program?			
Are flows measured prior to allowing new connections?			
Number of permanent meters? Number of temporary meters?			
What type(s) of meters are used?			
Number of rain gauges?			
How frequently are flow meters checked?			
Do the flow meter checks include: <input type="checkbox"/> independent water level, <input type="checkbox"/> checking the desiccant, <input type="checkbox"/> velocity reading, <input type="checkbox"/> cleaning away debris, <input type="checkbox"/> downloading data, <input type="checkbox"/> battery condition?			
Are records maintained for each inspection?			
Do the flow monitoring records include: <input type="checkbox"/> descriptive location of flow meter, <input type="checkbox"/> type of flow meter, <input type="checkbox"/> frequency of flow meter inspection, <input type="checkbox"/> frequency of flow meter calibration?			
Are flow data used for billing, capacity analysis, and/or I/I investigations?			
What is the ratio of peak wet weather flow to average dry weather flow at the wastewater treatment plant?			
Does the owner or operator have any wet weather capacity problems?			
Are low points or flood-plain areas monitored during rain events?			
Does the owner or operator have any dry weather capacity problems?			

## VII. E. SSES: Smoke Testing and Dyed Water Flooding

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator have a smoke testing program to identify sources of inflow and infiltration into the system including private service laterals and illegal connections? If so please describe.			
Are there written procedures for the frequency and schedule of smoke testing?			
Is there a documented procedure for isolating line segments?			
Is there a documented procedure for notifying local residents that smoke testing will be conducted in the area?			
What is the guideline for the maximum amount of line to be tested at one time?			
Are there guidelines for the weather conditions under which smoke testing should be conducted?			
Do the written records contain location, address, and description of the smoking element that produced a positive result?			
What follow-up occurs as a result of positive results for smoke or dye testing?			
Is there a goal for the percent of the system smoke tested each year?			
What percent of the system has been smoke tested over the past year?			
Does the owner or operator have a dyed water flooding program If so please describe.			
Is there a goal for the percent of the system dye tested each year?			
What percent of the system has been dye tested over the past year?			
Does the owner or operator share smoke and dye testing equipment with another owner or operator?			

Comments:



## VII. F. SSES: Manhole Inspection

Question	Response	Documentation Available	
		Yes	No
Does the owner or operator have a routine manhole inspection and assessment program?			
What is the purpose of the inspection program?			
Does the owner or operator have a goal for the number of manholes inspected annually?			
How many manholes were inspected during the past year?			
Do the records for manhole/pipe inspection include the following: <input type="checkbox"/> conditions of the frame and cover; <input type="checkbox"/> evidence of surcharge; offsets or misalignments; <input type="checkbox"/> atmospheric hazards measurements; <input type="checkbox"/> details on the root cause of cracks or breaks in the manhole or pipe including blockages; <input type="checkbox"/> recording conditions of corbel, walls, bench, trough, and pipe seals; <input type="checkbox"/> presence of corrosion, if repair is necessary; <input type="checkbox"/> manhole identifying number/location; wastewater flow characteristics; <input type="checkbox"/> accumulations of grease, debris, or grit; <input type="checkbox"/> presence of infiltration, location, and estimated quantity; <input type="checkbox"/> inflow from manhole covers?			
Are manholes susceptible to inflow identified and inspected on a regular frequency?			
Is there a data management system for tracking manhole inspection activities?			
What triggers whether a manhole needs rehabilitation?			
Does the owner or operator have a multi-year Capital Improvements Program that includes rehabilitation, replacement, and repair of manholes?			
How are priorities established for rehabilitation, replacement, and repair of manholes?			
Has the owner or operator established schedules for performing rehabilitation, both short term and long term of manholes?			

Question	Response	Documentation Available	
		Yes	No
Has funding been approved for the rehabilitation of manholes?			
Does the owner or operator have a grouting program?			

Comments:



**VIII. A. Rehabilitation: Manhole Repairs**

Question	Response	Documentation Available	
		Yes	No
What rehabilitation techniques are used for manhole repairs?			
How are priorities determined for manhole repairs?			
What type of documentation is kept?			
Does the owner or operator use manhole inserts?			
Are they used system wide or only on low lying manholes?			

Comments:

**VIII. B. Rehabilitation: Mainline Sewers**

Question	Response	Documentation Available	
		Yes	No
What type of main line repairs has the owner or operator used in the past?			
Does the owner or operator currently use any of above techniques for main line repairs? What other techniques is the owner or operator presently using?			
How are priorities established for main line repairs?			
What type of follow-up is performed after the repair (e.g., CCTV)?			

Comments:



# EXAMPLE

## COLLECTION SYSTEM PERFORMANCE INDICATOR DATA COLLECTION FORM

**I. General Information**

- A. Agency Name \_\_\_\_\_
- B. Agency Address  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_
- C. Contact Person \_\_\_\_\_
- D. Telephone: Voice \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_
- E. Data provided for latest fiscal/calendar year, 20\_\_\_\_

**II. Collection System Description**

- A. Service Area \_\_\_\_\_ Square miles
- B. Population Served \_\_\_\_\_
- C. System Inventory \_\_\_\_\_

Miles of gravity sewer	Miles of force main	Number of maintenance access structures	Number of pump stations	Number of siphons	Number of air, vacuum, or air/vacuum relief valves

- D. Number of Service Connections:  
Residential \_\_\_\_\_ Commercial \_\_\_\_\_ Industrial \_\_\_\_\_ Total \_\_\_\_\_
- E. Lateral Responsibility (check one)
1. At main line connection only \_\_\_\_\_
  2. From main line to property line or easement/cleanout \_\_\_\_\_
  3. Beyond property line/cleanout \_\_\_\_\_
  4. Other \_\_\_\_\_
- F. System combined (storm and sanitary)? Yes \_\_\_ No \_\_\_ If yes, % combined \_\_\_\_
- G. Average Annual Precipitation \_\_\_\_\_ inches
- H. System Flow Characteristics (total for service area)

Peak Dry Weather Flow (MGD)	Peak Wet Weather Flow (MGD)	Average Daily Flow (MGD)

**III. Special Conditions**

A. Indicate local conditions that are accounted for during design, construction, operation, and maintenance of the collection system.

1. Precipitation: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

2. Terrain: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

3. Soils: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

4. Temperature: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

5. Groundwater: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

6. Geology: Yes \_\_\_\_ No \_\_\_\_ If yes, provide brief explanation \_\_\_\_

7. Other: \_\_\_\_

B. Is corrosion a significant problem? Yes \_\_\_\_ No \_\_\_\_

• Is there a corrosion control program in place? Yes \_\_\_\_ No \_\_\_\_

C. Is odor a significant problem? Yes \_\_\_\_ No \_\_\_\_

• Is there an odor control program in place? Yes \_\_\_\_ No \_\_\_\_

D. Is grease a significant problem? Yes \_\_\_\_ No \_\_\_\_

• Is there a grease control program in place? Yes \_\_\_\_ No \_\_\_\_

E. Are roots a significant problem? Yes \_\_\_\_ No \_\_\_\_

• Is there a root control program in place? Yes \_\_\_\_ No \_\_\_\_

**IV. Age Distribution of Collection System**

Age	Gravity Sewer, miles	Force Mains, miles or feet	Number of Pump Stations
0 - 25 years			
26 - 50 years			
51 - 75 years			
> 76 years			

**V. Size Distribution of Collection System**

Diameter in inches	Gravity Sewer, miles	Force Mains, miles or feet
8 inches or less		
9 - 18 inches		
19 - 36 inches		
> 36 inches		

**VI. Distribution of Gravity Sewer By Material**

- A. Vitrified Clay Pipe (VCP) \_\_\_\_\_ Miles  
 B. Reinforced Concrete Pipe (RCP) \_\_\_\_\_ Miles  
 C. Unreinforced Concrete Pipe (CP) \_\_\_\_\_ Miles  
 D. Plastic (all types) \_\_\_\_\_ Miles  
 E. Brick \_\_\_\_\_ Miles  
 F. Other \_\_\_\_\_ Miles  
 G. Other \_\_\_\_\_ Miles  
 H. Other \_\_\_\_\_ Miles

**VII. Distribution of Force Mains By Material**

- A. Reinforced Concrete Pipe (RCP) \_\_\_\_\_ (circle one) miles or feet  
 B. Prestressed Concrete Cylinder Pipe (PCCP) \_\_\_\_\_ miles or feet  
 C. Asbestos Cement Pipe (ACP) \_\_\_\_\_ miles or feet  
 D. Polyvinyl Chloride (PVC) \_\_\_\_\_ miles or feet  
 E. Steel \_\_\_\_\_ miles or feet  
 F. Ductile Iron \_\_\_\_\_ miles or feet  
 G. Cast Iron \_\_\_\_\_ miles or feet  
 H. Techite (RPMP) \_\_\_\_\_ miles or feet  
 I. High Density Polyethylene (HDPE) \_\_\_\_\_ miles or feet  
 J. Fiberglass Reinforced Plastic (FRP) \_\_\_\_\_ miles or feet  
 K. Other \_\_\_\_\_ miles or feet

**VIII. Preventive Maintenance of System****A. Physical Inspection of Collection System, Preventive Maintenance**

Inspection Activity	Total Annual Labor Hours Expended for This Activity	Total Completed (Miles of Pipe or Manholes Inspected Annually)	Crew Size (s)
CCTV			
Visual Manhole Inspection, Surface Only			
Visual Manhole Inspection, Remove Cover			
Visual Gravity Line Inspection, Surface Only			
Visual Force Main Inspection, Surface Only			
Other (Sonar, etc.)			

**B. Mechanical and Hydraulic Cleaning, Preventive Maintenance**

Cleaning Activity	Total Annual Labor Hours Expended for This Activity	Total Annual Labor Hours Expended for Scheduled PM	Total Miles Cleaned Annually	Crew Size (s)	Range of Pipe Diameters Cleaned
Hydraulic Jet					
Bails, Kites, Scooters					
Combination Machines					
Rod Machines					
Hand Rodding					
Bucket Machines					
Chemical Root Control					
Chemical or Biological Grease Control					



**IX. Dry Weather Stoppages**

- A. Number of stoppages, annually \_\_\_\_\_
- B. Average time to clear stoppage \_\_\_\_\_
- C. Number of stoppages resulting in overflows and/or backups annually \_\_\_\_\_
- D. Total quantity of overflow(s) \_\_\_\_\_
- E. Is there an established procedure for problem diagnosis? Yes \_\_\_\_ No \_\_\_\_
- F. Are future preventive measures initiated based on diagnosis? Yes \_\_\_\_ No \_\_\_\_
- G. What equipment is available for emergency response? \_\_\_\_\_

**X. Repairs and Rehabilitation, Proactive**

- A. Number of annual spot repairs identified \_\_\_\_\_
- B. Number of annual spot repairs completed \_\_\_\_\_
- C. Percent of spot repairs contracted \_\_\_\_\_
- D. Number of manholes identified for rehabilitation \_\_\_\_\_
- E. Number of manholes rehabilitated annually \_\_\_\_\_
- F. Percent of manhole repairs contracted \_\_\_\_\_
- G. Feet of main line needing rehabilitation \_\_\_\_\_
- H. Feet of main line rehabilitated \_\_\_\_\_
- I. Percent of main line rehabilitation contracted \_\_\_\_\_
- J. Number of manholes scheduled for rehabilitation under Capital Improvement Program (s) \_\_\_\_\_
- K. Feet of main line scheduled for rehabilitation under Capital Improvement Program (s) \_\_\_\_\_

**XI. Repairs and Rehabilitation, Reactive**

- A. Number of annual line features \_\_\_\_\_
- B. Number of line repairs \_\_\_\_\_

**XII. Pump Stations**

- A. Number of pump stations inspected \_\_\_\_\_
  - Frequency of inspections \_\_\_\_\_ (daily, every other day, weekly)
- B. Number of inspection crews \_\_\_\_\_
- C. Crew size \_\_\_\_\_
- D. Number of pump stations with pump capacity redundancy \_\_\_\_\_
- E. Number of pump stations with backup power sources \_\_\_\_\_
- F. Number of pump stations with dry weather capacity limitations \_\_\_\_\_
- G. Number of pump stations with wet weather capacity limitations \_\_\_\_\_
- H. Number of pump stations calibrated annually \_\_\_\_\_
- I. Number of pump stations with permanent flowmeters \_\_\_\_\_
- J. Number of pump stations with remote status monitoring \_\_\_\_\_
- K. Number of pump stations with running time meters \_\_\_\_\_
- L. Number of mechanical maintenance staff assigned to mechanical maintenance \_\_\_\_\_
- M. Number of electrical maintenance staff assigned to electrical maintenance \_\_\_\_\_
- N. Total labor hours scheduled annually for electrical and mechanical PM tasks \_\_\_\_\_
- O. Total labor hours expended annually for electrical and mechanical PM tasks \_\_\_\_\_

**XIII. Pump Station Failures, Dry Weather**

- A. Number of failures resulting in overflows/bypass or backup, annually \_\_\_\_\_
- B. Total quantity of overflow/bypass \_\_\_\_\_ Gallons or MG
- C. Average time to restore operational capability \_\_\_\_\_ hours
- D. Total labor hours expended for electrical and mechanical corrective maintenance tasks \_\_\_\_\_
- E. Is failure mode and effect diagnosed? Yes \_\_\_\_ No \_\_\_\_
- F. Are future preventive measures initiated based on diagnosis? Yes \_\_\_\_ No \_\_\_\_
- G. What equipment is available for emergency response? \_\_\_\_\_



**XIV. Force Mains**

- A. Force mains inspected annually \_\_\_\_\_ miles or feet (visual surface inspection of alignment)
- B. Force mains monitored annually \_\_\_\_\_ miles or feet (pressure profile, capacity)
- C. Number of force main failures annually \_\_\_\_\_
- D. Cause(s) of force main failures \_\_\_\_\_

**XV. Air Relief/Vacuum Valves**

- A. What is frequency of valve inspections? \_\_\_\_\_
- B. What is frequency of PM (backflushing, etc)? \_\_\_\_\_
- C. Number of annual valve failures \_\_\_\_\_
- D. Cause(s) of valve failures \_\_\_\_\_

**XVI. System Operation and Maintenance Efficiency**

- A. Total full time or full time equivalent staff assigned to O & M (excluding administration staff but including line managers, supervisors) \_\_\_\_\_
- B. Total estimated labor hours actually expended for active O & M tasks (this is the total above less hours for sick, vacation, holidays, training, breaks, etc., not directly related to performing O & M tasks) \_\_\_\_\_

**XVII. Level of Service**

- A. Average annual rate for residential users \_\_\_\_\_
- B. Rate based on: water consumption \_\_\_\_\_ Flat rate \_\_\_\_\_ Other \_\_\_\_\_
- C. Number of complaints annually \_\_\_\_\_
- D. Number of complaints that are agency responsibility \_\_\_\_\_
- E. Number of public health or other warnings issued annually \_\_\_\_\_
- F. Number of claims for damages due to backups annually \_\_\_\_\_
- G. Total cost of claims settled annually \_\_\_\_\_

**XVIII. Financial**

- A. Total annual revenue received from wastewater \_\_\_\_\_
  - 1. % of revenue for long-term debt \_\_\_\_\_
  - 2. % of revenue for treatment and disposal \_\_\_\_\_
  - 3. % of revenue for collection and conveyance \_\_\_\_\_
- B. Current value of collection system assets \_\_\_\_\_
- C. Annual O & M expenditure \_\_\_\_\_
- D. Annual CIP expenditure for repair, replacement, or rehabilitation \_\_\_\_\_
- E. Annual O & M training budget \_\_\_\_\_
- F. Total number of O & M personnel (including administrative in O & M department) \_\_\_\_\_
- G. Number of personnel with collection system certification \_\_\_\_\_
- H. Number of personnel qualified for collection system certification \_\_\_\_\_
- I. Amount of O & M budget allocated for contracted services \_\_\_\_\_
- J. Hydroflush cost per foot \_\_\_\_\_
- K. Rodding cost per foot \_\_\_\_\_
- L. Bucketing cost per foot \_\_\_\_\_
- M. CCTV cost per foot \_\_\_\_\_
- N. Spot repairs, cost each \_\_\_\_\_

**XIX. Safety**

- A. Total labor hours assigned to O & M \_\_\_\_\_
- B. Number of lost time injuries \_\_\_\_\_
- C. Total lost time days \_\_\_\_\_
- D. Total cost of lost time injuries \_\_\_\_\_

**XX. Regulatory**

- A. Total number of violations issued annually \_\_\_\_\_
- B. Total cost of fines paid annually \_\_\_\_\_
- C. What is minimum reportable quantity in gallons? \_\_\_\_\_
- D. What is time reporting requirement? \_\_\_\_\_
- E. Number of annual WWTP upsets due to wet weather flow \_\_\_\_\_

**XXI. General**

- A. Has SSES been performed on system? Yes \_\_\_\_\_ No \_\_\_\_\_
- B. Total O & M positions currently budgetd \_\_\_\_\_
- C. Total O & M positions currently filled \_\_\_\_\_
- D. Is computerized maintenance management system (s) used for O & M managing? Yes \_\_\_\_ No \_\_\_\_
- E. Is GIS system used for O & M managing? Yes \_\_\_\_\_ No \_\_\_\_\_

**XXII. Procedures or Other Documentation Available**

- A. Overflow, bypass and containment Yes \_\_\_\_\_ No \_\_\_\_\_
- B. Problem evaluation and solution Yes \_\_\_\_\_ No \_\_\_\_\_
- C. Cleanup procedure Yes \_\_\_\_\_ No \_\_\_\_\_
- D. Failure mode and effect procedure Yes \_\_\_\_\_ No \_\_\_\_\_
- E. O & M budget process Yes \_\_\_\_\_ No \_\_\_\_\_
- F. O & M budget with line item detail Yes \_\_\_\_\_ No \_\_\_\_\_
- G. Long-range CIP planning for system expansion, rehabilitation, and replacement Yes \_\_\_\_\_ No \_\_\_\_
- H. Is there a written procedure for cleanup to mitigate effect of overflow? Yes \_\_\_\_\_ No \_\_\_\_\_
- I. Is there a written procedure for containing overflows and bypasses? Yes \_\_\_\_\_ No \_\_\_\_\_
- J. Is there an established procedure for containing overflows and bypasses? Yes \_\_\_\_\_ No \_\_\_\_\_
- K. Is there an established procedure for problem evaluation and solution? Yes \_\_\_\_\_ No \_\_\_\_\_
- L. Is there an established procedure for cleanup to mitigate effect of overflow? Yes \_\_\_\_\_ No \_\_\_\_\_
- M. Is there a grease control program? Yes \_\_\_\_\_ No \_\_\_\_\_
- N. Is there a pretreatment program? Yes \_\_\_\_\_ No \_\_\_\_\_
- O. Is there a private source I/I reduction program? Yes \_\_\_\_\_ No \_\_\_\_\_
- P. Do you have chronic O & M problems that are designed into your system? Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, provide brief description \_\_\_\_\_
- Q. Do you have chronic O & M problems that are constructed into your system? Yes \_\_\_\_\_ No \_\_\_\_  
If yes, provide brief description \_\_\_\_\_
- R. How would you rate your construction inspection program?  
Very effective \_\_\_\_\_ Needs improvement \_\_\_\_\_ Poor \_\_\_\_\_

**XXIII. Definitions/Clarifications**

- A. Maintenance access structures, most commonly manholes, in your system that are incorporated into your O & M program.
- B. Pump capacity redundancy is the ability to maintain pumping at design capacity with the largest pump out of service.
- C. Remote status monitoring is any remote monitoring system such as alarm telemetry or SCADA that provides remote pump station status information.
- D. You will notice that in the section on stoppages and pump station failures, we are asking for dry weather incidents only. Dry weather system performance is a good indicator or effectiveness of O & M program. If you have wet weather information that you wish to provide also, please do.
- E. Under the Special Conditions sections we are identifying conditions that are present in your system that require consideration during design, construction, and O & M of your system.

- F. Any of the questions dealing with labor hours are designed to determine total labor hours irrespective of crew size or crews that are only assigned to cleaning, for example, less than full time.
- G. Our goal is to obtain data that can be or are standardized and that are accurate. We also realize that some data may not be available; however, data can be accurately estimated. If you estimate data please follow with an (E).
- H. If data is not available please indicate "NA." If data does not apply to your system, please indicate by "DNA."
- I. Failure mode and effect refers to any established procedure you have to diagnose system failures to determine the cause and effect of the failure. This can apply to crews clearing stoppages or to pump station failures.
- J. Pump station inspection (XII) means scheduled inspection by operators to verify station operation and perform PM. It excludes electrical or mechanical craft maintenance.
- K. Stoppage in section IX refers only to stoppages other than pump stations. Pump stations are covered in Section XIII. Backup in this case refers to a basement or other structure backup as opposed to main line sewer backup.

**XXIV. Additional Comments**

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## **Appendix B**

### **EXAMPLE INTERVIEW SCHEDULE AND TOPICS**

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## EXAMPLE INTERVIEW SCHEDULE AND TOPICS

### Days 1 and 2 Interviews

Work Practice or Maintenance Function	Description	Examples of Discussion Topics and Supporting Documents	Name	Interview Date, Time, and Location
Senior Management	<p>Discuss project expectations, report review and comment process.</p> <p>Overview of organizational structure and "culture".</p> <p>Identify sensitive issues and how to approach.</p> <p>Schedule</p>			
Project Kick off Meeting	<p>Overview and purpose of project.</p> <p>Interview and field assessment process.</p> <p>Report content and review process.</p> <p>Questions and answers</p>	None		
Physical Inspection and Testing – Gravity sewer system	<p>Visual Inspection, pipe alignment.</p> <p>CCTV</p> <p>Smoke and Dye Testing</p> <p>Other</p>	<p>Reports, inspection forms, performance data, inspection strategy, crew assignments and schedules, equipment available, current expenditures and budgeted amounts, area maps, Standard Operating Procedures, field maps.</p>		

Work Practice or Maintenance Function	Description	Examples of Discussion Topics and Supporting Documents	Name	Interview Date, Time, and Location
Preventive Maintenance - Mechanical and hydraulic cleaning	High velocity jets and combination machines. Other hydraulic methods Rodding Machines Bucket Machines	Reports, performance data, preventive maintenance cleaning strategy, crew assignments and schedules, equipment available, current and budgeted, problem areas, Standard Operating Procedures, Standard Maintenance Procedures, problem diagnosis		
Chemical and biological cleaning	Root control Grease control Odor control Corrosion control	Grease control ordinance, enforcement, odor and corrosion control strategy, root control program, design for O&M considerations, materials used (MSDS), reports, performance data, preventive maintenance cleaning strategy, crew assignments and schedules, equipment available, current and budgeted, problem areas, Standard Operating Procedures, Standard Maintenance Procedures, problem diagnosis, public education, enforcement		
Pump Stations	Routine inspection Electrical and mechanical maintenance SCADA Standby/emergency systems Valves Foremains	Logs, inspection sheets, Standard Maintenance Procedures, Standard Operating procedures, pump station inventory and attribute data base, spares inventory, Reports, performance data, preventive maintenance strategy, crew assignments and schedules, equipment available, current and budgeted, critical pump stations, Standard Operating Procedures, Standard Maintenance Procedures, problem diagnosis, preventive and predictive maintenance methods, maintenance tasks and frequencies, O&M manuals, capacity issues		



Work Practice or Maintenance Function	Description	Examples of Discussion Topics and Supporting Documents	Name	Interview Date, Time, and Location
Training and Certification	Training program, technical, supervisory and management. Certification program	Knowledge, skills and abilities, basic skills, career paths, minimum qualifications, certification, educational assistance program, internal and external training, OJT, training budget		
Work Management	Planning and scheduling work Materials management Priority Backlog management Procurement Manual or Computer Maintenance Management System (CMMS)	Complaints and emergencies normal hours and after hours. Corrective, preventive and predictive maintenance work orders, work backlog, labor utilization, reports,		



Work Practice or Maintenance Function	Description	Examples of Discussion Topics and Supporting Documents	Name	Interview Date, Time, and Location
Safety	<p>Safety committee</p> <p>Safety meetings</p> <p>Safety enforcement</p> <p>Documentation of comprehensive safety training</p> <p>Compliance with safety regulations</p> <p>Documentation of effectiveness of safety program (e.g., reduction of accidents)</p> <p>Documentation of attendance and learning at safety training sessions</p>	Policy and procedures for trenching, confined space, lockout tagout, PPE. Safety manual, formal training, tracking, accident investigation		
Financial	<p>Annual O&amp;M Budget</p> <p>Rates</p> <p>CIP for rehabilitation/rehab</p> <p>Non-enterprise fund allocations</p>	O&M budget process, line item accounts, five year CIP plan, repair, rehabilitation, replacement strategy for pipes and pump stations		

<b>Work Practice or Maintenance Function</b>	<b>Description</b>	<b>Examples of Discussion Topics and Supporting Documents</b>	<b>Name</b>	<b>Interview Date, Time, and Location</b>
Construction and Repair	Emergency repair	Reports, inspection forms, performance data, inspection strategy, crew assignments and schedules, equipment available, current and budgeted, area maps, Standard Operating Procedures, field maps,		
	Spot repairs, gravity system			
	Rehabilitation			
	Lateral installation			
	Inspection			
	New Construction			
Fleet Management	Testing	Inventory, repair and replacement process, maintenance turn around time, preventive maintenance, Standard Operating Procedures, Standard Maintenance Procedures, CMMS,		
	Maintenance			
	Replacement			
	Availability			
	Budgeting			

**Day 3 - Field*****Pump Stations***

<b>Work Practice or Maintenance Function</b>	<b>Description</b>	<b>Examples of Discussion Topics and Supporting Documents</b>	<b>Name</b>	<b>Interview Date, Time and Location</b>
Pump Station Maintenance	Submersible Cast in place wet well dry well Prefabricated Grinder/Low Pressure System	Logs, O&M manuals, on-site procedures, vehicles and equipment, SCADA, Supervisory controls, electrical systems, flow meters, HVAC, variable speed systems, chronic problems, pumps and hydraulic systems.		

**Day 4 – Field*****Facilities and Crews***

<b>Work Practice or Maintenance Function</b>	<b>Description</b>	<b>Examples of Discussion Topics and Supporting Documents</b>	<b>Name</b>	<b>Interview Date, Time and Location</b>
Facilities	Electrical and mechanical repair shops and equipment Warehouse and equipment storage areas Vehicle maintenance shops Crew areas; locker rooms, training areas, dispatch areas	Logs, O&M manuals, on-site procedures, vehicles and equipment, SCADA, Supervisory controls, electrical systems, flow meters, HVAC, variable speed systems, chronic problems, pumps and hydraulic systems,		
Crews	CCTV Cleaning Construction Repair	N/A		
Exit Interview	Overview of findings for week	None		

## **Appendix C**

### **INFORMATION SOURCES**

**Information Sources**  
(Updated November 2004)

**WEBSITES** (water and/or wastewater-oriented; financial related)

EPA National Compliance Assistance Clearinghouse	<a href="http://www.epa.gov/clearinghouse">www.epa.gov/clearinghouse</a>
Compliance Assistance Centers	<a href="http://www.assistancecenters.net">http://www.assistancecenters.net</a>
Construction Industry Compliance Assistance Center	<a href="http://www.cicacenter.org">www.cicacenter.org</a>
EPA NPDES website	<a href="http://www.epa.gov/npdes">http://www.epa.gov/npdes</a>
EPA Operator On-Site Technical Assistance Program-104(g) (hands-on assistance to small municipal WWTP operators at no cost to community)	<a href="http://www.epa.gov/owm/mab/smcomm/104g/sstc.htm">www.epa.gov/owm/mab/smcomm/104g/sstc.htm</a>
EPA Office of Wastewater Management	<a href="http://www.epa.gov/owm">www.epa.gov/owm</a>
EPA Clean Water Tribal Grant Program	<a href="http://www.epa.gov/owm/mab/indian/cwisa.htm">www.epa.gov/owm/mab/indian/cwisa.htm</a>
EPA Colonias Program	<a href="http://www.epa.gov/owm/mab/mexican">www.epa.gov/owm/mab/mexican</a>
EPA Clean Water State Revolving Loan Fund Program	<a href="http://www.epa.gov/owm/cwfinance/cwsrf">www.epa.gov/owm/cwfinance/cwsrf</a>
EPA Website (Headquarters & Regions)	<a href="http://www.epa.gov/">www.epa.gov/</a>
EPA Small Business Gateway	<a href="http://www.epa.gov/smallbusiness">http://www.epa.gov/smallbusiness</a>
Environmental Finance Center	<a href="http://sspa.boisestate.edu/efc">http://sspa.boisestate.edu/efc</a>
National Environmental Services Center/WV University	<a href="http://www.nesc.wvu.edu">www.nesc.wvu.edu</a>
Local Govt. Environmental Assistance Network	<a href="http://www.lgean.org">www.lgean.org</a>
Rural Community Assistance Program (RCAP)	<a href="http://www.rcap.org">www.rcap.org</a>
Water Environment Federation (WEF)	<a href="http://www.wef.org">www.wef.org</a>
AMSA	<a href="http://www.amsa-cleanwater.org/pubs/">www.amsa-cleanwater.org/pubs/</a>
American Water Works Assoc. (AWWA)	<a href="http://www.awwa.org/">http://www.awwa.org/</a>
National Association of Towns & Townships (NATAT)	<a href="http://www.natat.org/">http://www.natat.org/</a>

**PUBLICATIONS /TRAINING VIDEOS /NEWSLETTERS, etc.**

EPA National Service Center For Environmental Publications (NSCEP)  
USEPA/NSCEP  
PO Box 42419  
Cincinnati, OH 45242  
Tele: 1-800-490-9198 or 513-489-8190 (fax: 513-489-8695)

EPA Office of Water Resource Center  
Tele: 202-566-1729 (24 hours)  
[center.water-resources@epa.gov](mailto:center.water-resources@epa.gov)

National Environmental Services Center (formerly the National Small Flows Clearinghouse)

West Virginia University Small Business Gateway

P.O. Box 6064

Morgantown, WV 26506

Tele: 1-800-624-8301

California State University - Sacramento

Tele: 916-278-6142

(training videos, etc.)

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33



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